Method as well as device for extraction of a root

The invention relates to a method for extracting a root according to the main description of Claim 1, as well as a device for applying the method.

In dental technology it is common that during the extracting of a tooth and following the administering of a local anaesthetic the root is first loosened somewhat inside the gum with a tool that is pushed into the periodontal gap, and the tooth is then pulled out with pliers together with the root. This does however become problematic if the tooth is a broken one or if the same is covered with a crown, where practically no grip surface is available for the pliers, and if only the root alone is to be extracted.

It is the purpose of this invention to provide a method for the simple extraction of a root and a device for applying the method.

This task is solved in accordance with the invention by a method with the characteristics of Claim 1 as well as a device for applying the method according to Claim 8.

Further preferred embodiments of the method of this invention as well as the device of this invention form the subject of the subclaims.

The fact that a pin is inserted into the root and affixed there for extracting the same, whereafter a pulling element functionally linked with a manually activatable tensioning device is inserted into the pin, and that subsequently the pulling force required for extracting the tooth is created and applied to the root substantially in the axial direction of the same by means of the supported tensioning device partially inserted into the mouth means that a relative large pulling force can be applied to the root without excessive need of force and without space problems and possibly a risk of injury within the mouth. The device of this invention is simple and cost-effective, and enables easy handling.

The invention will now be explained with reference to the drawings, whereby:

Fig. 1 shows a longitudinal cross-section of an embodiment of a device of this invention for extracting a root;

Fig. 2 shows an overview of the device illustrated in Fig. 1;

Fig. 3 shows a cross-sectional view along the line III-III in Fig. 1; and

Fig. 4 shows a threaded pin as part of the device of this invention, with a counter piece for screwing the threaded pin into the root.

Fig. 1 shows a device 1 for extracting a root, incorporating a pin 2 that can be inserted into the root and affixed there, a pulling element 3 that can be inserted into the pin 2, and a tensioning device 4 functionally linked with the pulling element 3.

ATTACHMENT "A"

The pin 2 of the embodiment illustrated here takes the form of a threaded pin which is screwed into the tooth root, preferably in the direction of its axis. However, other means for affixing the pin 2 to the tooth root could be envisaged (this could for example consist of a cement or adhesive connection or an expanding pin), and the inserting in the direction of the axis of the root is sometimes not possible, or no longer possible, for example when the root is not straight or is already equipped with one or two screws for the fitting of a crown.

The pin 2 is equipped with a head 5, which is in turn equipped with a hook-shaped recess 6. As indicated in Fig. 4 the head 5 is preferably equipped with an external shape (square) of the type that makes it possible to screw a standardised adapter 7 into the root, onto which the head 5 can be affixed.

The pulling element 3 already mentioned above is then hooked into the hook-shaped recess 6 with a cross pin 8. The pulling element 3 can for example take the form of a wire, a string, or a rope. At the other end of the pulling element 3 a cross pin 9 is also provided, with which the pulling element 3 can be affixed to the tensioning device 4 as is described in more detail below.

The tensioning device 4 incorporates a stretched base body 10 which in turn incorporates a guide nut 11 with a T-shaped cross section for a tensioning support 12 that is longitudinally adjustable in relation to the base body 10. A threaded bolt 15 extending in a longitudinal direction is screwed into the tensioning support 12 with a front end 15a, whereby the rear threaded part 15b is guided through a support sleeve 16 screwed onto the rear end of the base body 10 by means of screws 14. A ribbed nut 20 is allocated to the threaded part 15b, the same being supportable at a rear facing surface 17 of the support sleeve 16. The tensioning support 12 can be supported in its longitudinal direction with a rear surface 21 upon a front facing surface 18 of the support sleeve 16 on the one hand, and with a surface 22 directed towards the front on a front base body part 10a on the other.

The tensioning support 12 is equipped with a number of hook-shaped recesses 23 arranged behind each other in longitudinal direction, into which the pulling element 3 can be hooked with the cross pin 9. A diverting part 24 for the pulling element 3 is affixed to the front base body part 10a, on which the pulling element 3 which is held substantially in an axial direction of the root in relation to the pin 3 on the one hand, and tensioned at right angles to the same in a longitudinal direction of the tensioning device 4 on the other hand, rests. The diverting part 24 takes the form of a firmly affixed disc segment, the cross section of which forms a guide nut 24a for the pulling element 3, the same being affixed in a front side, fork-shaped part 25 of the front base body part 10a by means of a cross pin 26.

On the side that faces away from the guide groove 11 for the tensioning support 12 the base body 10 is equipped with a groove 27 with a dovetail cross-section (see especially Fig. 3), into which a support plate 28 made of plastic is inserted. The front base body section 10a also incorporates a groove 29 for a rotating segment 30 illustrated in Fig. 1 on the same side of the base body 10, the axis of which extends diagonally to the displacement direction of the tensioning support 12, and which can be inserted from the side into the groove 29, whereby the groove 29 forms the guide surfaces for an external as well as an internal circumference surface 31, 32 of the rotating segment 30. For this the groove 29 is placed in the front base body section 10a in such a way that the pulling element facing the pin 2 extends coaxially in relation to the rotating segment 30. The rotating segment 30 forms a cut-out defined by surfaces 34, 35, whose alignment can be changed, i.e. adjusted by turning the rotating segment 30. The rotating segment 30 is – much like the base body 10 with the support plate 28 – equipped with a support disc 38 made of plastic, which is inserted into a groove 37 of the rotating segment 30 with a dovetail cross-section (Fig. 1). The support plate 28 and the support disc 38 each form a resting surface 28a, 38a for supporting the tensioning device 4 in the mouth.

When a root is to be extracted the pin 2 is first inserted into the root and affixed there, preferably screwed into the same. One end of the pulling element 3 is then inserted into the pin 2, for example hooked into the recess 6 with the cross pin 8, and affixed to the tensioning device 4 that has been inserted into the mouth and is partially supported there with the other end. With the selection of a suitable recess 23 for hooking into the other cross pin 9 the position of the location in the mouth that is to be treated, i.e. the distance between the supporting point of the tensioning device in the mouth and the root to be extracted must be considered and a suitable pre-tensioning of the pulling element 3 created. The position of the tensioning support 12 between the front base body part 10a and the front facing surface 18 of the support sleeve 16 as the starting position prior to creating the actual pulling force for extracting the root can also be quickly adjusted by means of axially adjusting the ribbed nut 20 to suit the threaded part 15b. With a tensioning support 12 abutting against the front facing surface 18 of the support sleeve 16 with the rear surface 21 the axial distance of the ribbed nut 20 from the rear facing surface 17 of the support sleeve 16 determines the path along which the tensioning support 12 can be quickly moved in a longitudinal direction without rotating the ribbed but 20. The actual pulling force for extracting the root is then created by a ribbed nut 20 abutting against the rear facing surface 17 of the support sleeve 16 by turning the same, and the subsequently created slow adjustment of the threaded part, i.e. tensioning support. For this it is of advantage that a relatively large pulling force can be created via the thread without excessive force. In addition the diverting of the pulling element 3 and the right-angled

arrangement of the tensioning support 12 in relation to the pin 2 affixed into the root means that the root is pulled substantially in the direction of the axis of the same without creating space problems and a possible risk of injury within the mouth.

The support of the tensioning device 4 is carried out by means of the support surface 28a of the support plate 28 (on the edge of the mouth) and via the support surface 38a of the support disc 38 affixed to the rotating segment 30 (for the location to be treated). The turnable rotating segment 30 can be adjusted to suit the relevant local conditions around the location that is to be treated in order to guarantee optimised support.

The fast adjustment of the tensioning support 12 already mentioned, which is limited in its maximum size by the abutment of the tensioning support 12 against the support sleeve 16 on one side, and by the front base body section 10a on the other side, whereby the size can be adjusted, i.e. reduced by means of the ribbed nut 20, can also be used for pre-treating, i.e. loosening the root in that a reciprocal movement of the tensioning support applies a sudden impact force on the root prior to applying the actual pulling force. It is of course also possible when required to carry out a loosening in the periodontal gap by means of a suitable tool in the known way.

The device of this invention is simple and cost-effective and enables easy handling. The base body 10 of the tensioning device 4 can for example be held with the thumb and middle finger of one hand, whereby the index finger supports the positioning of the pulling element on the diverting part 24, and the ribbed nut 20 is activated with the other hand. In principle the pulling force could also be applied mechanically.

It is possible to envisage means which effect a sudden impact upon the pulling element 3 during the turning of the ribbed nut 20, for example in that the facing surface 17 of the support sleeve 16 and the ribbed nut abutting against the same 20 are equipped with corresponding radially extending saw teeth or suchlike. During the turning of the ribbed nut an additional increase can therefore be created across a certain angle, which is then decreased again.